

JPRS 76241

18 August 1980

West Europe Report

SCIENCE AND TECHNOLOGY

No. 29



FOREIGN BROADCAST INFORMATION SERVICE

NOTE

JPRS publications contain information primarily from foreign newspapers, periodicals and books, but also from news agency transmissions and broadcasts. Materials from foreign-language sources are translated; those from English-language sources are transcribed or reprinted, with the original phrasing and other characteristics retained.

Headlines, editorial reports, and material enclosed in brackets [] are supplied by JPRS. Processing indicators such as [Text] or [Excerpt] in the first line of each item, or following the last line of a brief, indicate how the original information was processed. Where no processing indicator is given, the information was summarized or extracted.

Unfamiliar names rendered phonetically or transliterated are enclosed in parentheses. Words or names preceded by a question mark and enclosed in parentheses were not clear in the original but have been supplied as appropriate in context. Other unattributed parenthetical notes within the body of an item originate with the source. Times within items are as given by source.

The contents of this publication in no way represent the policies, views or attitudes of the U.S. Government.

PROCUREMENT OF PUBLICATIONS

JPRS publications may be ordered from the National Technical Information Service, Springfield, Virginia 22161. In ordering, it is recommended that the JPRS number, title, date and author, if applicable, of publication be cited.

Current JPRS publications are announced in Government Reports Announcements issued semi-monthly by the National Technical Information Service, and are listed in the Monthly Catalog of U.S. Government Publications issued by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Indexes to this report (by keyword, author, personal names, title and series) are available from Bell & Howell, Old Mansfield Road, Wooster, Ohio 44691.

Correspondence pertaining to matters other than procurement may be addressed to Joint Publications Research Service, 1000 North Glebe Road, Arlington, Virginia 22201.

18 August 1980

WEST EUROPE REPORT

SCIENCE AND TECHNOLOGY

No. 29

CONTENTS

ENERGY

Automated Manufacture of Solar Generator Components (VDI-Z, Feb 80)	1
Solar Plant Power Described (INDUSTRIES & TECHNIQUES, 31 May 80)	8
Rhone-Poulenc To Commercialize Solar Collector (SEMAINE DE L'ENERGIE, 9 Jun 80)	9
Commercialization of Solar Technology Progresses (FRANKFURTER ALLGEMEINE BLICK DURCH DIE WIRTSCHAFT, 27 Jun 80)	10
EEC Funds Solar, Geothermal R&D (NOTIZIARIO COMITATO NAZIONALE PER L'ENERGIA NUCLEARE, May 80)	12

INDUSTRIAL TECHNOLOGY

Exhibition of Modern Manufacturing Technology Reviewed (HANDELSBLATT, 18 Jun 80)	13
Revolutionary New Tank Truck Design (Jaakko Pihlaja; HELSINGIN SANOMAT, 19 Mar 80)	16
Flexible Assembly System To Use Automated Riveting (FRANKFURTER ALLGEMEINE BLICK DURCH DIE WIRTSCHAFT, 2 Jul 80)	21
Plasma Smelting Improves Pig Iron Production (FRANKFURTER ALLGEMEINE BLICK DURCH DIE WIRTSCHAFT, 3 Jul 80)	24

Briefs		
Coal Gasification Plant Contract		26
SCIENCE POLICY		
Thirty Percent Increase in Industrial Research Needed		
(AFP SCIENCES, 12 Jun 80)		27
Budget for France Is On Course		
(AFP SCIENCES, 12 Jun 80)		28
France-Japan R&D Cooperation Proposed		
(ELECTRONIQUE ACTUALITES, 27 Jun 80)		30
TRANSPORTATION		
New R&D in Railroad Transportation Discussed		
(VDI-Z, Feb 80)		31

ENERGY

AUTOMATED MANUFACTURE OF SOLAR GENERATOR COMPONENTS

Duesseldorf VDI-Z in German Feb 80 pp 141-143

[Text] Beginning in 1973, institutions of higher education and industry tried more intensely than ever before to create the preconditions for using solar-electric and solar-thermal generator systems under terrestrial conditions with sufficiently low overall expenditure, in autonomous systems for supplying energy.¹ The considerable significance of these activities is indicated, for example, by the results of a study, which leads the UNO to regard not only the use of biomass, but especially the use of solar systems which do not require a special infrastructure, as the only long term solution of the energy supply problem in tropical and sub-tropical regions of the earth. In agreement with this conclusion, the demand for systems to convert solar energy into electrical or thermal energy is already especially great in these geographical areas.¹

Already several years ago, AEG Telefunken considerably expanded activities which relate to photovoltaic solar technology. The objectives, which in the meantime have partly been reached, included the following:

Reduction of costs incident to the production of solar cells and solar generators and specifically by using the capabilities offered by the respectively available technologies², Figure 1, as well as by automating production,

furnishing all the subsystems required for solar installations (component systems) which can be specifically assembled for this purpose, taking into account optimization criteria, Figure 2,

worldwide testing and systematic marketing production of solar electric and/or solar thermal systems whose characteristics and subsystems always correspond to the geographic situation of the respective application site as well as to given requirements (wishes in accord with needs). (In such a solar system, it may be desirable to use radiative energy converted both into electrical and thermal energy. Such a system, for example, was developed within the scope of the project "Sonntlan" by a research group, and was set up in New California (Mexico).)

- 6 subsystem matching
- 7 subsystem load
- 8 distributor
- 9 unit
- 10 electrical block circuit diagram
- 11 control

Solar systems which consist of individual subsystems can have a design which is adapted to their respective application, and can also be expanded step by step.

In the generator subsystem, flat modules are preferably used as radiation receivers, that is components where the surfaces of the solar cells lie in one plane. The solar cells are connected together electrically in parallel and in series. Flat modules, which can also convert diffuse radiation into electrical energy, are permanently installed, corresponding to the respective geographical latitude. Furthermore, there are hybrid modules, which convert radiative energy both into thermal energy (solar collectors) and into electrical energy (solar cells). Hybrid modules can be used in solar systems, for example to heat domestic water and to generate electricity for electrical devices or household equipment. Finally, with special photovoltaic generator modules, concentrators are used to increase the radiative energy per unit surface. In this way, the solar cell surface required for a prescribed electrical power can be reduced. With such radiation receivers, it is possible to limit the heating of the solar cells and the resulting decrease of their efficiency, by means of a coolant. It is also possible to use the dissipated heat as process heat. Hybrid systems with concentrators will decline in significance as the cost for solar generators declines.

The storage subsystem is needed to match the energy offer to the requirements by the loads. With a photovoltaic solar system, it consists of an energy storage medium and a device for regulating the charging or respectively discharging processes. At the present time, only lead storage batteries are available as a storage medium whose characteristics meet certain technical and economic requirements. With lead storage batteries that have reinforced plate electrodes, the investment costs per energy unit are about 500 DM/kWh and this for a lifetime of twelve years.

The matching subsystem is a current rectifier. With solar systems, it must be designed in such a way that the strongly load-dependent input voltage can be controlled. As an inverse rectifier, it should in general transform a relatively low d.c. voltage into a higher and stabilized a.c. voltage. With certain drives as loads, the output voltage of the current rectifier must also be adjustable.

The load subsystem is an extremely important component of solar systems from a systems point of view. It involves the purposeful insertion (integration), for example, of electrical drives. The solution of the problems associated therewith requires comprehensive development which involves several areas. For example, this concerns electrical supply modules for

communications devices as well as drives for pumps, compressors, ventilators, and cooling systems. Among other objectives, one goal here is to make available direct current drive systems for solar installations, which will be optimized with respect to such utilization.

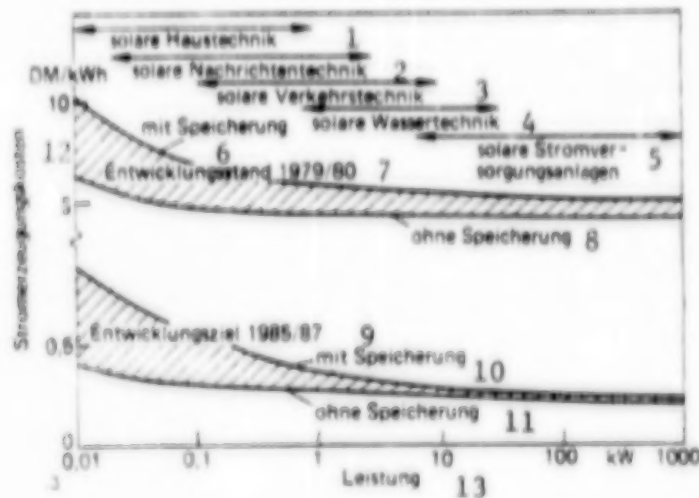


Figure 3 Electrical current generating costs (costs per unit energy) for solar installations as a function of power; desired development goal¹

- 1 solar house technology
- 2 solar communication technology
- 3 solar traffic technology
- 4 solar hydrotechnology
- 5 solar electric power supply systems
- 6 with storage
- 7 developmental status 1979/80
- 8 without storage
- 9 developmental objectives 1985/87
- 10 with storage
- 11 without storage
- 12 electrical power generating costs
- 13 power

Figure 3 shows the cost development expected for solar systems, in the view of AEG Telefunken. A distinction is here made between various applications areas. The power range of solar systems for domestic applications extends up to a few kilowatts; in this application, solar energy is converted into electrical and/or thermal energy and can be used, for example, to supply power for television units with an integrated energy storage medium and a charge regulator, to operate compressor cooling systems with a collectorless d.c. motor as a drive, as well as for heating water in a system equipped with rotary pumps. Communications applications concern the power supply of, for example, voice broadcasting units, transmission systems (which are

located at a site that is favorable for the receiving system, for example at a mountain top), or location broadcasting systems for monitoring pipelines. Traffic applications refer, for example, to buoys for shipping, to beacons for air traffic, or to traffic control on highways. Especially in view of solving the energy supply problems of the "Third World", hydrological applications of solar systems are especially significant. When they are suitably designed, such applications can be used for irrigation, for converting salt water to drinking water, or to purify drinking water. In this connection, the water purification system shown in Figure 4 is especially remarkable. This system works by a pressure filtration method, which uses the principle of inverse osmosis. Using a solar generator of 24 m^2 , which corresponds to a design for 2.4 kW power, and with a daily operating time of eight hours, this system can obtain 175 liters of fresh water from 320 liters well water with a maximum salinity of one percent. With electrical power supply systems, which are designed for a power of more than 50 kW up to several hundred kW , the solar-thermal method for generating electrical power is still used today. However, in recent years, one has tried successfully to increase the power of solar electric (photo-voltaic) electrical supply systems, so that they become economically comparable to solar-thermal systems. This upper limit, at the present time, lies at 10 kW (order of magnitude¹).

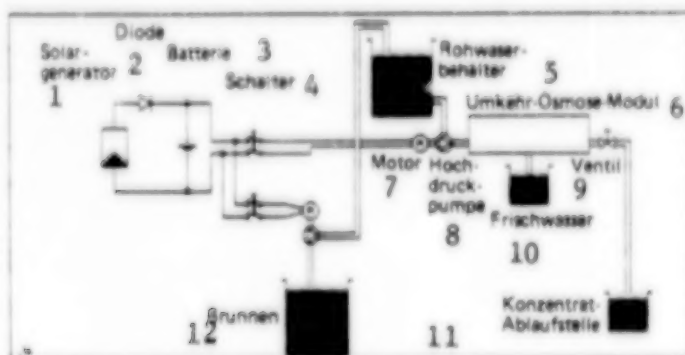


Figure 4 Block diagram of a water purification system¹

- 1 solar generator
- 2 diode
- 3 battery
- 4 switches
- 5 raw water container
- 6 inverse osmosis module
- 7 motor
- 8 high pressure pump
- 9 valve
- 10 fresh water
- 11 concentrate drainage point
- 12 well

Under terrestrial conditions, solar-electrical systems must be operated more economically. With such systems, the proportion of the cost that applies to the photovoltaic solar generators must be sufficiently small. For this reason, the development of economical production methods has extraordinary significance. Production processes concern the fabrication, for example, of silicon wafers with definite semiconductor properties and the application of metallic contact structures to the surface of the semiconductor elements of solar cells. The production processes also concern the assembly of several solar cells into mechanically and electrically stable solar generator modules. Production methods must be developed which facilitate an economical production of photovoltaic solar generators. AEG Telefunken has been pursuing this objective since 1977, within the scope of a project funded by the Federal Ministry for Research and Technology. In connection with this, the technical area of new technologies and space travel (Wedel, Holstein) of this enterprise has designed a production lane, controlled by a process computer, to fabricate solar generator modules for terrestrial applications. This production lane is the first in the world where all the production processes occur automatically. It was already almost completely installed in October 1979.

The production installation in Wedel consists of individual production stations, which are inserted into a conveyance system and which therefore are coupled to one another. It uses square solar cells with an edge 50 mm or 100 mm long. These cells are first automatically welded on a welding machine with a metallic binder. Afterwards, the solar cells are electrically sized under definite measurement conditions, whereby a solar simulator is used for testing. In accord with the respective measurement results, the solar cells are then divided into five categories and are assigned to the associated output magazines. The next production step also occurs automatically: here, a certain number of solar cells, all of which belong to one category, are placed in matrix-form on a welding table. The electrical connection of these solar cells is effected by welding. The number of solar cells connected in series here determines the maximum possible output voltage of a solar generator module. The electrically connected solar cells are then brought to a conveyer unit, where they are imbedded between plastic sheets and glass panes. Afterwards, the conveyer units, thus equipped, first reach the storage area of a joining chamber. From there, under the control of the process computer, they are conducted into this chamber to join the modules. After they emerge from the joining chamber, the modules traverse a washing installation. They are then equipped with an aluminum frame and with a terminal cable. A solar simulator is again used for the final testing of the solar generator modules that have been fabricated in this way.

An AEG 80-20 process computer controls the production lane, on which (10 W) modules are currently being fabricated. These consist of solar cells with dimensions 50 mm x 50 mm. It is intended soon also to fabricate power modules with a rated power of 40 W and a surface of 0.5 m². These will be

assembled from solar cells with dimensions 100 mm x 100 mm. When fabricating such modules, the automated system has a production capacity which annually corresponds to solar generator modules with a rated power of altogether about 3 MW.

Footnotes

- 1 Schmidt, E. Terrestrial utilization of solar energy - examples of applications and previous experience. Lecture on the 15th Technical Press Colloquium of AEG Telefunken, Timmendorfer Strand, 4th and 5th October 1979.
- 2 New generation of terrestrial solar generators. VDI-Z Vol. 118, 1976, No. 24, page 1196.

8348

CSO:3102

ENERGY

SOLAR POWER PLANT DESCRIBED

Paris INDUSTRIES & TECHNIQUES in French 31 May 80 p 9

[Text] Studies were undertaken 4 years ago in the high-temperature solar energy sector at the request of the CNRS [National Center for Scientific Research] and were concretely reflected in the decision to participate in the building of the Themis solar power plant in Targassonne in the eastern Pyrenees. This 2-megawatt power plant built with the costs being shared by the COMES [Solar Energy Commission] and the EDF [French Electric Power Company] will be equipped with 200 heliostats of 50 square centimeters each distributed over a surface of 5 hectares, directing the solar flow to a tower 80 meters high. The solar collector will be a heat exchanger utilizing dissolved salts which can have a storage capacity representing 6 hours' sunshine at 800 watts per square meter, or 40 megawatt hours. The steam generator linked with the exchanger has a classic steam condensation cycle activating a high-yield radial turbine. In this phase, the diffuse nature of solar energy is clearly evident. In order to produce 2,000 kilowatts in 6 to 10 hours, 5 hectares must be covered with mirrors.

The total cost of the Themis power plant is estimated at 130 million francs, and commissioning is planned for 1981. The price per kilowatt hour will be between 5 and 6 francs.

0157

CSO: 3102

ENERGY

RHONE-POULENC TO COMMERCIALIZE SOLAR COLLECTOR

Paris SEMAINE DE L'ENERGIE in French 9 Jun 80 p 7

[Text] Rhone-Poulenc has just created the Industrial Company for Solar Energy Development (CIDES) for the purpose, initially, of producing and marketing a new solar collector--the Dynasol. This company, whose president is Claude Driout, will be established in the Lyons region, on the site of the Gorge de Loup Rhone-Poulenc Textile Plant. It will be operational in September 1980.

The Dynasol solar collector was perfected in the Venissieux Applications Workshops in Rhone-Poulenc, Rhone. The original aspect of this apparatus lies in the substitution of a silicone tube (alimentary quality) equipped with a polyamide braid between two strips of aluminum for the copper, steel or aluminum traditionally used. One of the strips has a black coating of silicone. The collector serves a number of needs: production of household or industrial hot water, heating of swimming pools, protection of buildings against freezing and the heating of premises.

The establishment of this company confirms the commitment of Rhone-Poulenc to the solar energy field. It will be recalled that more than a year ago, the group established an office for the development of solar energy products, and that within the framework of an agreement signed with the CGE [General Electrical Equipment] group, it is working to perfect a procedure for producing silicon for use in the photovoltaic generation of electricity.

5157

CSO: 3102

ENERGY

COMMERCIALIZATION OF SOLAR TECHNOLOGY PROGRESSES

Frankfurt/Main FRANKFURTER ALLGEMEINE BLICK DURCH DIE WIRTSCHAFT in German
27 Jun 80 p 1

[Text] Fue. Hamburg, 26 June--In the period from 1974 to 1979 the FRG government spent approximately DM 150 million on research and development in the field of utilization of regenerative sources, for instance solar and wind energy. In the 4 years to come the funds are scheduled to be doubled. In the past almost DM 150 million have been invested by industry to utilize solar energy for household and industrial purposes alone. A considerable portion of what knowledge and application technology have been derived from this investment into the future may be seen during the international "Solartechnik 80" exhibition on the Hamburg exhibition site. Parallel to this event the Congress Center is staging the "3rd International Solar Forum," attracting some 1,000 scientists from all over the world. In connection with this convention the status seminars on wind and solar energy, organized by the Federal minister for research and technology, will take place.

The Solar Energy Federation, cosponsor of the solar forum, gives a very optimistic prognosis on the development of the future solar energy market. According to the federation, two major developments are emerging:

1. Replacement of heating oil by utilization of the sun's rays and environmental heat, above all, and
2. Export of solar equipment for various purposes (e.g. water treatment or process heat and energy generation) to countries with abundant sun.

Provided the existing solar technology were consistently utilized in the FRG and taking the estimated solar exports into account, the market volume could amount to approximately DM 110 billion in 1990 (1979: DM 2.1 billion), according to the federation's estimate. Simultaneously, some 280,000 jobs would be maintained or created in the decade to come. The federation members involved in electrical engineering, air and space travel, energy chemicals, heating, ventilation and air technology demand, among other things, that the government continue the steps which are politically necessary when acquiring solar systems (collectors, heat pumps, solar absorbers). They further claim that the promotion of research must also apply to projects which show promise in the long term, and that the specialized training of those who plan, install, and maintain solar systems must be intensified.

While Research Minister Hauff expects regenerative energies to make up 10 percent of the entire energy supply in the year 2000, he dampens excessive expectations regarding the new energy sources, saying that in spite of all efforts and the success achieved to date it would normally take decades for the new technology to be established on the market. In this connection Hauff pleaded for Federal funds in the form of investment subsidies to help introduce the products on the market. The International Solar Forum shows that many technical and often promising solutions have already been found, according to the research minister. Yet the consumer's willingness to utilize the regenerative energy sources will also depend on performance, costs, ease of maintenance and operation as well as on the system's durability, says Hauff. A political change in course could not be of assistance here. Decisions on the utilization of the various energy sources would not only be judged according to the technical potential, Hauff stated, but also according to the overall economic conditions.

The commercial introduction of solar energy further advanced a 1st year. According to the research minister's statements some 10,000 solar systems (a major portion for warm water generation) and more than 15,000 heat pumps (particularly for heating purposes) were in operation at the end of 1979. Hauff believes that the number of heat pumps may double in 1980. Industry had to ensure, however, that the increasing demand for these technologies would be satisfied, quality standards improved, and reasonable prices maintained by means of an extension of production capacities.

9544

CSO: 3102

ENERGY

EEC FUNDS SOLAR, GEOTHERMAL R&D

From NOTIZIARIO COMITATO NAZIONALE PER L'ENERGIA NUCLEARE in Italian May 80
p 28

[Unattributed article: "Financial Help for Solar and Geothermal Energy"]

[Text] The Commission, in sponsoring its two Research and Development programs dealing with "New Sources of Energy" (the first of which covered the period from 1975 to 1979 and the second from 1979 to 1983) has earmarked a total of 63.5 MUCE (millions of European Account Units; 1 UCE equals 1,100 lire) for solar energy and 31 MUCE for geothermic energy.

Solar energy was awarded 17.5 MUCE during the course of the first program and 46 MUCE during the second, which is slated to end in 1983, as mentioned above. During the first program, which has just ended, over 2,000 solar energy contracts were initiated dealing with water and space heating, to include heat storage; thermal power plants; solar cells (photovoltaic cells); production and use of biomasses for the production of energy as well as contracts dealing with other matters.

With regard to geothermic energy, the Commission set aside a total of 13 MUCE during the course of the first program and 18 MUCE for the second.

The first program looked into the use of this source of energy, be it for heating (geothermal waters with temperatures ranging from 50 to 120 degrees centigrade), or be it for the production of electricity. Research was particularly intense in those EEC countries less well endowed with this source of energy.

Data and information on EEC financial programs were extracted from the work by A. Strub entitled "EC Energy Research and Development Programmes in the Field of New Energy Sources and Energy Conservation" which was presented at the 25th Rome Nuclear Congress between 13 and 14 March 1980.

9209

CSO: 3102

INDUSTRIAL TECHNOLOGY

EXHIBITION OF MODERN MANUFACTURING TECHNOLOGY REVIEWED

Duesseldorf HANDELSBLATT in German 18 Jun 80 pp 105, 107

[Article: "Special Exhibition for Modern Manufacturing Technology"]

[Text] Duesseldorf--Fully automatic material handling, processing and assembly systems can be viewed at the Material Handling 1980--Fifth International Special Exhibition for Modern Industrial Manufacturing Technology in Zurich (with a special exhibit for connecting technology). Until 21 June 1980, 108 direct exhibitors from five countries will present the latest stage in handling and connecting technology in an area that encompasses 8,000 square meters, located in Halls 2 and 3.

Below are a few of the installations, machines, devices, tools and systems that were exhibited at the fair:

Asea IRb-60, a 5-axis robot, is suitable for cutting out glass fiber-reinforced plastic parts. The arm of the robot carries in its hand a pneumatically operated milling cutter (output 1 horsepower per 40,000 rpm, diameter between 2.5 and 4 mm, cutting speed approximately 2 meters per minute). The alignment produces cutting tolerances between ± 0.5 mm (manually ± 2 mm). Four spindles are loaded and unloaded manually. To control the hazardous polyester dust, the robot also carries a water spray gun.

The Jungheinrich bent-arm robot is used to operate CNC lathes. Other areas of use are arc welding and general handling of work pieces. The robots are operated by MPS multi processor systems--also a new development. They can be adapted to various applications. Software is also available from the supplier.

The Ratiomatic 5 assembly system by Montech, which has buffers that are located between the conveyor belts, adapts itself to the human work rhythm. The dimension of magazines, which function automatically as buffers, is

appropriate to the tasks. The capacity of these magazines is practically unlimited. Work pieces up to 100x100x100 mm can be mounted on these facilities. The individual stations can be manual work places, or half or fully automated work places. Fully automated round control tables can be integrated to produce assembly centers.

The production assembly units by Bosch can be used to construct flexible assembly lines on the basis of the double-belted assembly conveyor. They are suitable for single-place assemblies and automated assemblies. The conveyor belt itself is available in various sizes. Building parts for manual work places and automated stations facilitate quick construction and expansion of the installation. The conveyor can be adapted to the local availability of space by constructing a linear or a square facility. Integrated independent work places make possible work place groups with a big work volume. They can be connected to assembly lines with inserted buffers and automated short-cycle stations or assembly machines.

On the Elga-Variant by Degussa (Switzerland), an 8-cycle round-table soldering machine, mountings or oil burners are automatically supplied with flux, subsequently, they are preheated at several stations with burners and firmly bonded over a twofold soldering-wire conveyor. After air cooling, the parts and the equipment are cooled in a water shower cabin and cleaned of soldering flux residues. At the final station the loosened parts are automatically ejected.

The Presse-O-Mat by Unimec, an automatic connector, uses a transport arm (type BP 100) as a robot to connect two, three or even four parts. Sorted parts are selected by swinging arms or distributors, picked up by claws, joined, molded or riveted. The automatic machine completes 12 to 15 cycles per minute.

The feeder by Epple was developed for the full automatization of machine tools. It can use its patented gripping device--an arm with fingers--and an automatic magazine to handle, above all, turning parts of the feeder, whether symmetric or asymmetric, with or without drilling. Following an improvement, it now can also store corrugated parts in its magazine and load them into the machine as well as unload them with its corrugated gripping arm.

The torsion-spring conveyor implements by Manziken automatically extricate, sort, transport, store and individualize torsion springs between 1.5 and 16 mm in diameter into receptacles, using blasts of air. These implements are available with as many as 6 openings and can produce as many as 100 springs per minute per opening. The air is also used as a mode of transport and can move springs to work places as far away as 4 meters.

The "Laser-Optronic 815," a compact laser lettering system, permits fast and clean inscriptions on almost any material. Also problematic materials, such as hard metals, hardened steel, chromium-plated parts, can be provided with texts and company names. The smallest possible letter size is 0.2 mm.

The lettering is stored in the magazine of the machine at a fixed value. The size and width of the lettering and the spacing of letters and lines can be selected freely. Using the input terminal, it is possible to write directly with the machine, or company names and insignia can be programmed. For repeated use, texts can be stored on a floppy-disc unit. With the use of a microprocessor, a galvanometer mirror system is applied, which reduces the lettering geometry. Depending on the material that is to be inscribed, the galvanometer system permits lines up to 300 mm in length per second.

The TC 70 machine, a table model by Teca-Print, can be used to print on surfaces from 50x50 to 80x100 mm. The procedure also permits printing on uneven surfaces, since a soft tamp is used to remove the dye from the printed picture (steel or plastic) and transfer it to the printing material. Because the tamp adjusts to the surface, precise printing with excellent coverage is guaranteed. For containers and bulky printing materials, the tamp printing machine TC 460 K was developed. It has a tilt head which can be adjusted up to 90 degrees. Even print on edges and depressions can be precise with excellent coverage.

The Mikro-Mat by Dopag, a measuring and application device, was developed for cyanacrylate-second-adhesives and anaerobic hardening liquids (area of viscosity: 5 to 5000 mPas). The pneumatic device also permits the handling of combustible solvents at the workplace. In addition to adhesives, the device can also process aggressive media, marking dyes and solvents.

8991

CSO: 3102

INDUSTRIAL TECHNOLOGY

REVOLUTIONARY NEW TANK TRUCK DESIGN

Helsinki HELSINGIN SANOMAT in Finnish 19 Mar 80 p 26

[Article by Jaakko Pihlaja: "Self-supporting Tank Truck Into Serial Production; Good Demand Predicted for Finnish Invention"]

[Excerpt] For the past 2 years the transportation industry has seethed with curiosity, whispered and roared about reports emanating from Finland, a country otherwise in the sidelines. Highly placed leaders from the world's leading automotive truck manufacturers have been seen in the area of the developer's machine shop. Their agents have tried even secretly to gain entry into the production areas of the shop. The industry publications have dug for news and have published sparse reports in attempts to satisfy that hunger. The man behind the invention is a self-trained automotive builder Reijo Hirvonen, age 45, currently manager of a trucking firm.

Hirvonen gives an impression of boyish exuberance with success as he tells about the characteristics of the vehicle while in the cab of a production model just then produced.

He bears an expression of broadly smiling success and his speech bears a bit of roguishness toward a vast crowd of doubters.

"Well, I don't care to comment any further about engineering skills..."

Could this be an expression of expansiveness or an inventor's temperament and an enterpriser's pride? But in any event the practical builder has created a piece of work for which today extensive success is predicted.

The self-supporting tank cargo truck has been said to be the greatest innovation in cargo trucks since the invention of the cargo truck itself. The idea for the new truck jelled slowly in Hirvonen's mind and of the drawing board of a cargo tank manufacturing shop in Lieksa.

Having had the experience in the building of tank trailers, Hirvonen and shop foreman Lauri Eskelinen put their enthusiasm and skills together to bear on the proposition. According to Hirvonen, the technical assembling and testing of the vehicle itself involved no problems at all, but other difficulties and prejudices were plentifully encountered.

Hirvonen's faith in the special qualities of the vehicle and in the eventual success of the enterprise were not awayed by the hindrances and doubts. The man put forth all his property, all his effort, and his spiritual reserves to build a prototype, which became a sensation in the trucking world.

The prototype was put through an extensive tour of tests and demonstrations, during which the odometer accumulated 130,000 kilometers. At the end of 1979 the vehicle was sold to a businessman in Vehkalahti, who has already put an additional 40,000 kilometers on it in actual operation.

"Large Banknotes"

At the end of 1979 the Hollming Oy, a largely funded ship docking firm that has greatly expanded its field of operations, bought the Kestotankki Oy firm from Hirvonen. The price was "a suitcase full of large denomination banknotes" and a contract that guaranteed further development and manufacture of the invention.

The beginning of the preparations for serial production at the Kankaanpää factory of the Hollming Oy marked a turning point in Hirvonen's life. The independent enterpriser became a wage earner. The ego was soothed by the prospect of success, in which few outsiders had any faith. The work on the truck continued in the capacity of chief of product development.

"There was some relief, however," recalls Hirvonen. The outward indication of that was the new outgoing Mersu.

Hirvonen's idea is simple: A sturdily constructed aluminum tank does not need a separate chassis underneath it. An engine and wheels are attached underneath such a tank and an operator's cab is attached to the front end and thus the truck is completed.

The result of this solution is a highway crawler of graceful lines which, because of a special suspension system based on rubber springs, has exceptional riding qualities.

Because of the aluminum construction, about three tons have been eliminated from the empty weight of the truck. In liquid transportation this means an additional capacity of about 4,000 liters.

The low-slung design of the vehicle adds to the stability and safety and the comfort of the operator. The noise level inside the operator's cab compares favorably with that of the best passenger automobiles. The fuel consumption is remarkably low.

The young man from Pyhaselka began his career as a grocery store helper until he was admitted to a trade school to learn metalworking and electricity, after which he did electrical work for ten years. In the

automotive field Hirvonen became business manager and shareholder in the Keatotankki Oy, a truck trailer tank manufacturing firm in Hämeenlinna. After a period of somewhat over ten years, the firm became the property of the Hirvonen family and developed into the leading manufacturer of tank trailers in Finland.

After moving to Lieksa Hirvonen began his first experiments for adapting the trailer suspension system into use in trucks. He produced a prototype from an old truck which he used to haul a load of sand repeatedly through a gravel pit before a select group of trusted transportation professionals who thereby experienced a miracle at first hand.

Thousands of Kilometers of Test Drives

For two years Hirvonen made drawings and prototypes behind curtains and closed doors in his shop. Vague reports that aroused curiosity leaked abroad, but it was not until autumn 1978 that the miracle was unveiled. The first several thousands of kilometers of test drives had already been conducted.

The moment of fulfillment came to Hirvonen and Eskelinen when the prototype rolled out over the shop threshold on its own power. The builders then saw that the vehicle had come to life.

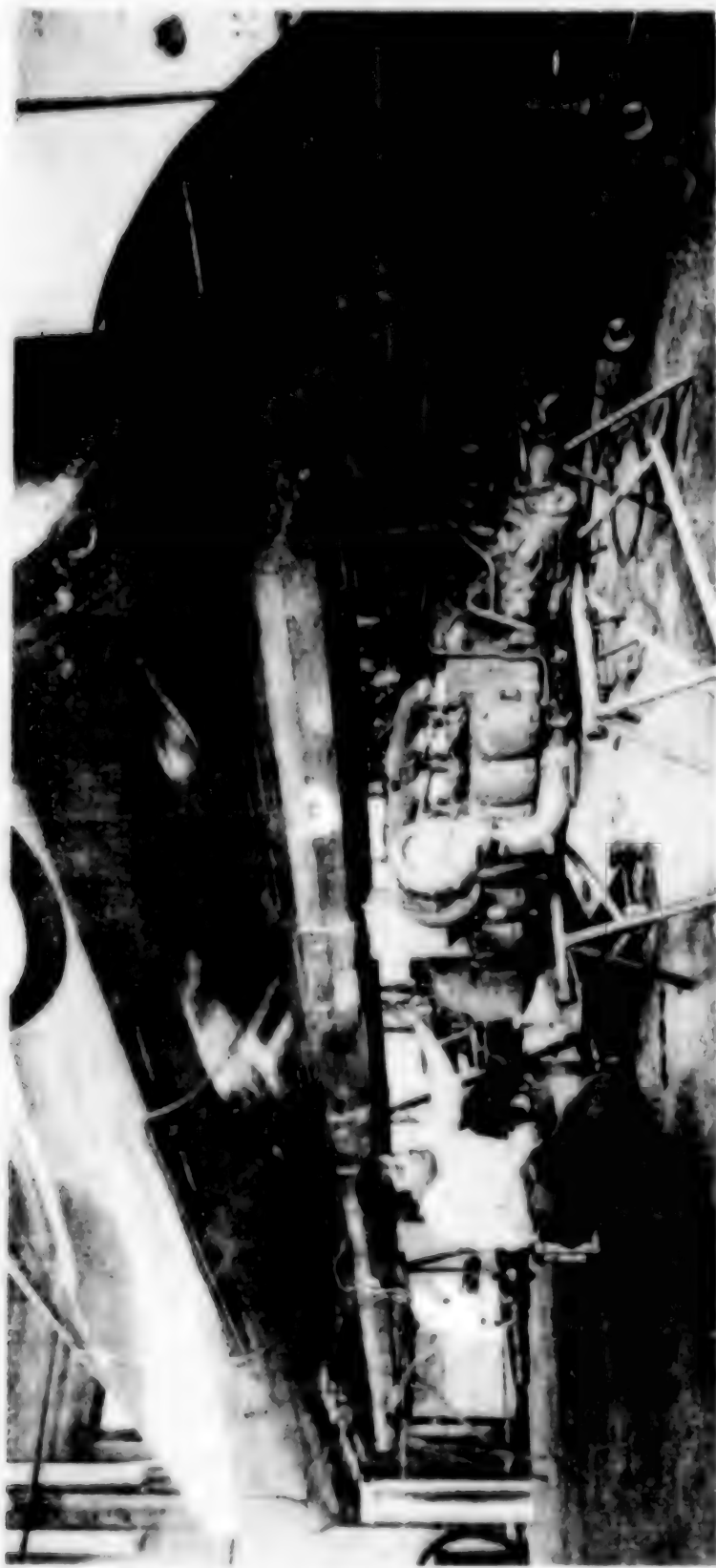
A lessening of tension took place on the day that Hirvonen was handed the type inspection certificate. The manufacturing contract provided the decisive phase.

The adapting of the hand-built test vehicle into serial production proved to be more complex than had been anticipated and the training of the workers required its share of time. After a year of development the production model equipped with simplified components and certain technical improvements is not completed. The first ten vehicles that were produced were sold in advance. The goal for 1980 is the production of 30 to 40 vehicles.

"It is as if a Higher Power had directed the entire project from its very inception," Hirvonen sighs. He is particularly satisfied by the fact that the vehicle is in capable Finnish hands.

Hirvonen gives no credit whatsoever to Finnish industry. Those whom one would think to be interested in the development and production of the vehicle did not even bother to answer inquiries. They were not interested in working together. But those abroad were more alert.

When the Finnish truck and tire manufacturers and financial institutions closed their doors, the Swedish, West German, and French manufacturers actually proffered their assistance and expertise. That is why this tank truck is powered by a Volvo engine, uses Man components, and moves on Michelin tires.



Reijo Hirvonen's concept is embarrassingly simple. An engine and wheels beneath a supporting tank structure and an operator's cab in front complete the truck.

There was one however, a Consultant Uolevi Raade who merits forthright praise for his full support during the most difficult phases of the developmental work and who created faith of a patriotic nature in the developer of the tank truck. Perhaps it was premonitional for the prototype to bear the colors and markings of the Neste Oy firm.

Credit must be given also to the dealings with the officials who were able to see the merits of the invention. Hirvonen is aware that there have been attempts at sabotage, but the dealings with the officials have progressed smoothly after elimination of the initial confusion.

According to Hirvonen, the tank truck is by no means the only possible application of the new idea in truck structure design. He is currently working on an application to peat transport vehicles and believes that this can be applied to gravel transport vehicles as well.

The shop will release a few vehicles during 1980 for international evaluation tests. As yet, there are no plans for exporting the vehicle.

Hirvonen is not afraid of competition. "The building of a motor vehicle is not a simple matter. Most certainly there will be imitators, but I believe that by then we will have something new to offer. We shall try to remain in the lead."

5955

CSO: 3102

INDUSTRIAL TECHNOLOGY

FLEXIBLE ASSEMBLY SYSTEM TO USE AUTOMATED RIVETING

Frankfurt/Main FRANKFURTER ALLGEMEINE BLICK DURCH DIE WIRTSCHAFT in German
2 Jul 80 p 5

[Article: "Flexible Assembly System Using Automated Riveting"]

[Text] VFW Vereinigte Flugtechnische Werke GmbH, Bremen--According to the company, the jointing of components accounts for approximately 50 percent of the manufacturing costs of an aircraft frame. A further breakdown of the percentage shows that 90 percent of these costs are caused by rivet setting alone. The balance is rivet procurement costs. The importance of an economical application of the riveting procedure in aircraft frame construction may be derived from the fact that an A300 airbus features more than 1 million riveted joints in spite of a high percentage of glued joints, according to a VFW statement.

The high costs of manufacture of an aircraft frame caused by riveted joints--which are even higher if double-planked assemblies are involved, e.g. controls, wings, flaps due to the fact that they are less accessible--can be reduced by new and efficient production procedures only. According to the Bremen company, this will be of particular importance in view of the accelerated extension of the airbus program.

A reduction of the costs of riveted joints can be achieved by combining various work steps like boring, lowering, or riveting in an automated riveting system developed for this purpose. Inserting the components in a standardized frame will enable the transfer of work pieces through the various assembly stations connected with each other. The entire process, i.e. component positioning, clamping, boring, lowering, rivet setting and hammering will be automated by means of a numerically controlled positioning equipment.

At present VFW is actively developing a numerically controlled flexible assembly line of this kind. It is to rationalize the accelerated A300 airbus and A310 airbus production which is starting now. The components to be manufactured by VFW as part of these programs include double-planked structures which require a high degree of technology. These components, e.g. passenger doors, cargo gates, cargo room floor flaps, and

spollers will feature a high percentage of riveted joints in spite of an extended use of gluing and composite fiber construction.

Due to the spherical deformation of these components, rivet hole boring and rivets require five-axial feed and positioning movements. As the automated riveting system does not move on its own, the positioner must have adequate freedom of movement so that the component will always be in a vertical position at the riveting point. In the VFW flexible assembly line the components to be manufactured are clamped into a so-called module frame, transported within it, and fed into the individual work groups. The module frames constitute the integrating part of the entire control system, which is comparable to a palletizing system as used with machine tools.

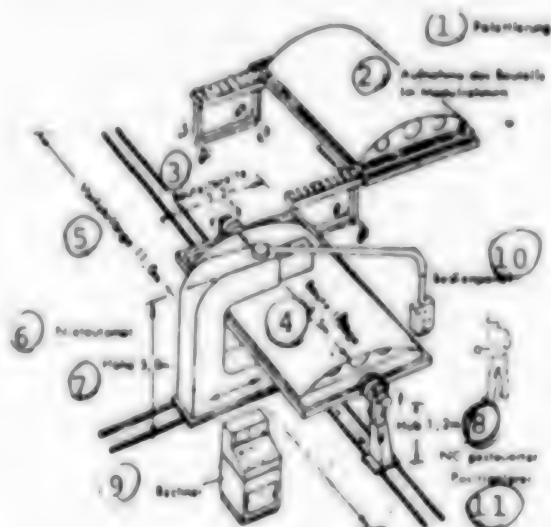
The process being developed will result in a cheaper manufacture, particularly of the spherically formed parts, a reduction of assembly steps, of the time the devices are occupied, and thus an increase in productivity. VFW believes that the quality of the new assembly system becomes particularly apparent at the automated riveting part of the system with positioner. While one to a maximum of one and a half rivets per minute can be hammered manually, the automated riveting equipment of the flexible system will complete 15 rivets in the same period.

According to VFW, the numerical control also guarantees high-accuracy reproducibility.

Diagram of Flexible Riveting System.

The figure illustrates the VFW automated riveting and assembly system. Center of the system is a riveting automat integrated into the flexible palletizing and positioning system for major components. The process chain includes the clamping into the module frame, automat feed, and the jointing procedure. The palletizing enables a continuous work process.

Figure: VFW



Key:

1. Palleting
2. Clamping component into module frame
3. Component width: 3.2 m
4. Component length: 8.5 m
5. Traversing distance: 11.0 m
6. Automated riveting equipment
7. Height: 5.0 m
8. Lift: 1.2 m
9. Computer
10. Operating panel
11. Numerically controlled positioner

9544

CSO: 1102

INDUSTRIAL TECHNOLOGY

PLASMA SMELTING IMPROVES PIG IRON PRODUCTION

Frankfurt/Main FRANKFURTER ALLGEMEINE BLICK DURCH DIE WIRTSCHAFT in German
3 Jul 80 p 7

[Article: "Plasmamelt' Is Expected To Improve Extraction of Pig Iron"]

[Text] Frankfurt, 2 July--The Swedish company AB Svenska Ball Bearing Factories (SKF) has developed a plasma smelting process for pig iron which, according to company information, would lower capital investment by half and production operating costs by 20 percent. Still other great advantages are connected with the new process: This processing method can be installed in existing blast furnaces. It can use almost any fossil fuel as a source of energy, and the fuel consumption will, compared to the conventional blast furnace operation, be reduced by a third.

In principle the process is characterized by a gas flow between the two electrodes of an electric arc; the arc is struck thereby and the gas is heated to extremely high temperatures, 3,000 to 15,000 degrees Celsius, whereupon it ionizes, i.e. it is transformed into a plasma. A plasma consists of positive ions, electrons and neutral particles. Large quantities of energy can be transmitted by the plasma while the energy loss in the generator is very low. In addition, both oxidizing and reducing gases can be heated with the same efficiency and without any change in composition. The extraction of iron rests heavily on these properties of the plasma generator.

In the case of the reduction process developed by SKF, called Plasma Melt, the pig iron melt is produced directly from the ore concentrate. Thereby the coke furnace installation, the sintering installation and the blast furnace chain are eliminated. Plasma Melt was developed as a continuous two-stage process with prereduction and fusion reduction. The energy consumption is about 25 percent lower than in the case of the conventional blast furnace operation. When the Plasma Melt method is installed in an existing blast furnace, a 300-percent increase in production can be expected from the same furnace. Also, the low environmental loading by the SKF process is amazing. The desulfuring installation required for pig iron production is eliminated. The quantity of exhaust gas is drastically reduced and the remaining gas does not--as is usually the case--need to be scrubbed.

In connection with the plasma reduction process for producing from ore sponge iron which is ready for use, SKF Steel has now, after completion of pilot studies and tests of the Plasma Melt process, reached a point where, in the opinion of the company, the Swedish Government must lend a hand with support funds in order to reach the production stage in the shortest possible time. For this purpose a half-size installation with a capacity of 50,000 to 60,000 tons per year of pig iron will do. The cost, adjusted for a construction period of 3 to 5 years will amount to about DM 45 million.

9160

CSO: 3102

INDUSTRIAL TECHNOLOGY

BRIEFS

COAL GASIFICATION PLANT CONTRACT--AEG Telefunken has been awarded the contract to supply the control system for the high-pressure coal gasification test facility which was put into service in the fall of 1979 at Dorsten. The gasification process was developed by Lurgi Coal and Petroleum Engineering, GmbH, and will be operated by a combine consisting of Ruhrgas AG; Ruhrkohle AG; and Steag AG. The nucleus of the control system, valued at about DM 700,000, is the Gadget 80 system linked to an AEG 80-20 minicomputer. It will take over the complete task of data acquisition and surveillance of measured parameters and will output information on critical operating conditions. In addition, the system stores all relevant data to be used by the interfaced large computer for statistical studies and test evaluations. The Gadget system includes interconnected equipment for report and data acquisition (even from stations external to the controlled loop) and for transmission to the operating consoles in the control center, including such items as teletypes, high-speed printers, visual displays with hard-copy equipment and a multichannel data logger for plotting measured parameters. The peripheral equipment for storing the process model and retained data consists of magnetic discs and tapes. [Text] [Zossen ELEKTRO-ANZEIGER in German Mar 80 pp 14-15] 9160

CSO: 9102

SCIENCE POLICY

THIRTY PERCENT INCREASE IN INDUSTRIAL RESEARCH NEEDED

Paris APP SCIENCES in French 12 Jun 80 p 2

[Text] The yield for the VIIth Plan calls for an increase of 30 percent in industrial research in France. The strengthening of the international competitive capacity of French industrial enterprises, their capacity for innovation and the development of their markets abroad are the absolute priorities which must guide the industrial redeployment of France from now until the year 2000.

Reviewing the options of the VIIth Plan, a work group with Mme Gilberte Beaux presiding urges an increase of 30 percent in industrial research in France.

The group therefore favors a "strategy of innovation," giving priority to products involving considerable technological and "technical" competence, "representing a decisive factor in the long run in the mastery of the market, profitability and practical elimination of the risk of delocalization."

According to the group, the volume of industrial research in France should be increased by 30 percent (i.e. 7 billion francs) to reduce the gap separating France from the level reached in the leading industrial countries (United States, Germany). The technological lag of France was reflected in 1978 in a deficit in the license and patent balance of 1 billion 131 million. To this end, the strengthening of state aid for innovation seems necessary to the group. In this connection it deplores the "inadequacy of the resources" from the ANVAR [National Research Development Agency] and recommends the development of its resources and their regional use.

5157

CSO: 3102

SCIENCE POLICY

BUDGET FOR FRANCE IS ON COURSE

Paris AFP SCIENCES in French 12 Jun 80 pp 1-2

[Text] A "good budget" for research in 1981. Following the negotiations by the prime minister, the 1981 research budget draft seems to have good prospects. According to Secretary of State for Research Pierre Aigrain, who is coordinating the "research package," "the draft budget calls for more than a billion francs for new operational measures. They will make possible, among other things, the establishment of 240 posts at the National Center for Scientific Research (CNRS), 55 at the National Institute for Health and Medical Research (INSERM), and 38 at the National Institute for Agronomical Research (INRA), and the application elsewhere of a development policy to absorb the pyramid of research assistants who will be promoted to the rank of research supervisors."

"The rate of increase in the personnel of other research bodies will be on an average the same," Mr Aigrain said.

It should be noted moreover that this rate of increase is about 2.6 percent per year for the research body personnel overall, confirming the neglect of the 3-percent rate in favor of regaining the percentage of the gross national product devoted to research.

The goal of the government is in fact to increase this rate to about 2.3 percent of the gross national product by 1985 (instead of the present 1.8 percent) to reach the same level as such countries as West Germany and Japan. "With the new budget, we are on this track," Mr Aigrain believes, with, however, a 2-to-3-year lag.

Another increase in the 1981 draft research budget involves the program authorizations (AP), i.e. investments and operational credit. In this sector, the rate of growth "will exceed 20 percent in current francs, it is true. This is the best budget of all the other government budgets," Mr Aigrain emphasized.

What is also important, in his view, is that the 1981 draft budget "maintains the balance between the background research, that is to say exploratory and finalized, and applied research."

In all, according to estimates the civilian research budget will increase by some 18 percent, to approach 20 billion francs.

Whatever the case, to reach the point at which France spends 2.3 percent of its gross national product for research, as is stressed in the recent Fauroux report drafted under the direction of the owner of Saint Gobain Pont-a-Mousson, at the request of Minister of Industry Andre Giraud and Mr Pierre Aigrain, the contribution of private industry to the financing of research and development will have to increase from 42 percent of the total, today's figure, to 48 percent by 1985. In absolute figures this represents a national expenditure on research and development increasing from 48 billion in 1980 to 68 billion in 1985, of which 13 billion would reflect the increase in the ratio of research expenditures from 1.8 percent to 2.3 percent of the gross national product.

These are substantial figures, above all considered in terms of a period of economic difficulties, and the Fauroux report suggests that the incentive to spend more on research be provided to enterprises in the form of fiscal deductions.

The report proposes that enterprises be authorized to deduct from the profits subject to the tax on companies a sum equal to half of the increase in constant francs in their expenditures on research and development in comparison to the preceding fiscal period. It is estimated that the amount of these deductions would come to 1.3 billion francs per year on an average, between 1981 and 1985. For the time being, the Fauroux report is under study. Its application, even if partial, would require research accounting by the enterprises which would be rather difficult to put into effect speedily.

5157

CSO: 3102

SCIENCE POLICY

FRANCE-JAPAN R&D COOPERATION PROPOSED

Paris ELECTRONIQUE ACTUALITES in French 27 Jun 80 p 3

[Excerpt] The French government has proposed a joint research program for the development of new energy sources and industrial technology to Japan, according to the Japanese daily NIHON KEIZAI SHIMBUN.

That newspaper reports that the various sectors involved are in particular industrial robots, computers and electronic components, aeronautics, energy-saving techniques, solar and geothermal energy and biomass.

This program also calls for the establishment of a French-Japanese trust to help these industries obtain export orders.

5157

CSO: 3102

TRANSPORTATION

NEW R&D IN RAILROAD TRANSPORTATION DISCUSSED

Deusseldorf VDI-Z in German Feb 80 p IV

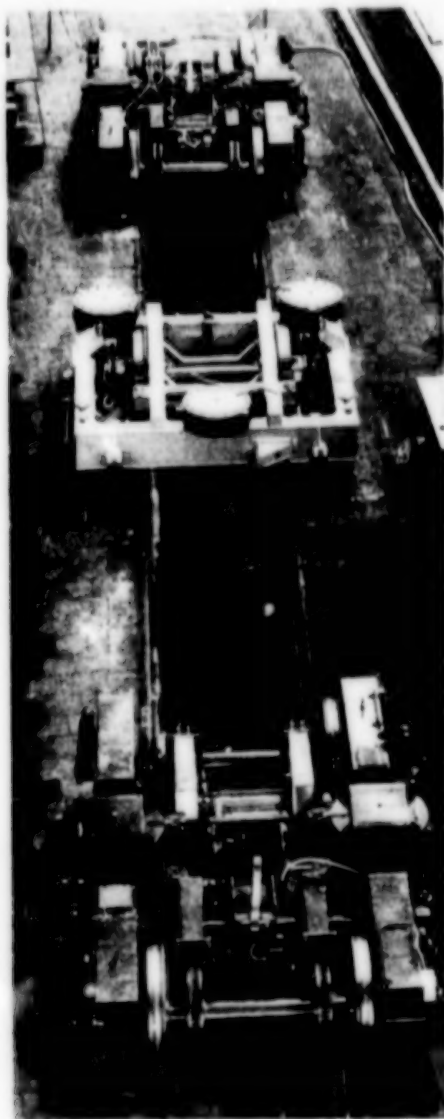
[Text] Experimental Railroad Car for 250 km/h Is Ready For Use

The trains of the German Federal Railroad presently travel according to schedule with speeds up to 200 km/h. However, considerable developmental reserves are still available in the wheel/rail system. This potential can be exploited by current research and technology for tomorrow's railroad needs. Since 1972, the Federal Ministry for Research and Technology (BMFT) has spent about 170 million DM to promote an extensive research program for making accessible the technical-scientific reserves of the railroad.

By now, basic research, laboratory and test stand experiments have been performed. Systematic experiments on actual track are now beginning. On 19 December 1979, the working community for wheel/rail track experiments Phase 1, consisting of the partners Krupp Industries and Steel Construction (managing), Krauss Maffei, Krupp Metallurgical Plants, Krupp MaK, MAN, MBB, Thyssen-Henschel, demonstrated the first experimental vehicle in Essen. This vehicle is equipped with the most modern measuring devices and computers. Furthermore, it has an experimental running gear in the middle between the usual trucks. This running gear will expand physical knowledge of vehicle running by experimental studies. The BMFT is funding the development and construction of the experimental vehicle as well as subsequent experiments, to the extent of 29.6 million DM.

During the running experiments that are now in their initial stage, servo-hydraulic vibration exciters will set the wheel set of the experimental running gear into vibration. The motional variables will be recorded and will be evaluated according to the methods of system identification. The results will provide information concerning the proper vibrations and the attenuation characteristics of the wheel set/track system. From this, information can be obtained concerning the stability of the running characteristics of the vehicles. The running experiments should demonstrate that the computer programs which have been developed can provide an optimum design for future rapid transit vehicles.

Beginning in 1980, the new vehicle will undergo experimental runs at maximum 250 km/h on lines of the Federal Railroad. Beginning in 1982, the vehicle will run on the experimental railroad installation which is currently under construction and which extends from Rheine (North Rhein-Westphalia) through Spelle to Freren (Lower Saxony). Beginning in 1983, a multi-component realistic experimental train will be available, which will attain a maximum speed of 250 km/h, and which will demonstrate the results of all the research and development work.



Support and steering running gear of the experimental vehicle, in the middle of the experimental running gear

END OF

FICHE

DATE FILMED

Sept 5-80
GD